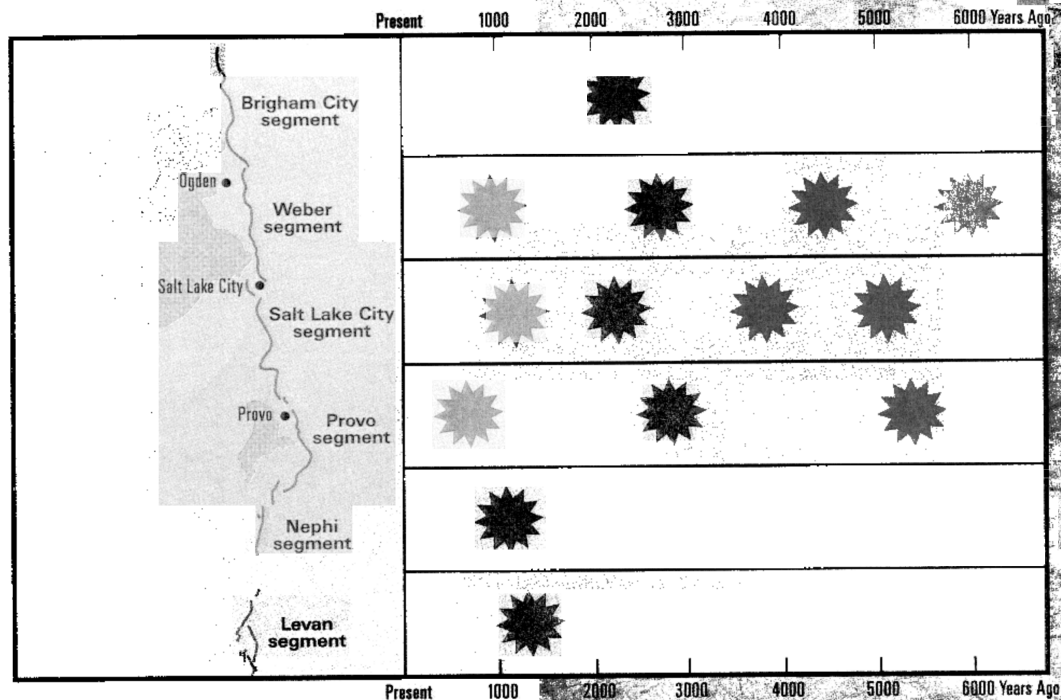


## H. EXCERPT: "THE WASATCH FAULT"

### When/how often?

Every 350 years?



Geologic studies show that at least 19 surface-faulting earthquakes (shown as starbursts on this generalized diagram) have occurred on the Wasatch fault during the past 6,000 years.

These earthquakes took place on the fault's five central segments (Brigham City, Weber, Salt Lake City, Provo, and Nephi) and one distal segment (Levan). Collectively, the "composite recurrence interval," or how often a large earthquake has occurred on the central portion of the Wasatch fault, is approximately once every 350 years. The last large earthquake happened about 600 years ago on the Provo segment, and possibly earlier on the Nephi segment (although the starburst position indicates a carbon-dated event closer to 1,200 years ago, some researchers estimate an earthquake occurred as recently as 400 years ago on the Nephi segment).

For any individual segment of the central portion of the fault, the "average recurrence interval" is longer – about every 1,200 to 2,600 years. In comparison, each of the distal segments have recurrence intervals of about 10,000 years or more. (recurrence intervals are long-term averages).

## HOW BIG? Magnitude 7.5?

The largest earthquake expected along the Wasatch fault is about **magnitude 7.5**. Scientists derived this estimate from the amount of displacement created by prehistoric earthquakes, the length of past fault ruptures, and comparisons with historic large earthquakes elsewhere. Prehistoric earthquakes on the Wasatch fault have typically displaced the ground surface about 6 to 10 feet for 20 to 40 miles. Some earthquakes have formed **scarps** almost 20 feet high. These 'typical' characteristics are estimated to form during earthquakes of about magnitude 7.5 or slightly smaller. This estimate concurs with the two largest historic earthquakes in the ISB. The 1983 Borah Peak, Idaho (**magnitude 7.3**) and the 1959 Hebgen Lake, Montana (**magnitude 7.5**) earthquakes displaced the ground surface for 20 miles, from about an average of 5 feet (Borah Peak) and 7 feet (Hebgen Lake) to a maximum of 20 feet (Hebgen Lake). Both earthquakes occurred on normal faults similar to the Wasatch fault.

## EARTHQUAKE HAZARDS

Earthquakes can generate several different geologic hazards. In addition to **ground shaking**, other hazards are **soil liquefaction**, **surface fault rupture**, **flooding**, and **slope failure**. Not only are buildings including homes endangered by these hazards, but water tanks, dams, roads, bridges, railways, airports, and **utility corridors** carrying electricity, water, sewage, natural gas, petroleum, and telephone service are all at risk. Along the **Wasatch Front**, many of these structures and utility lines are located on, or cross, the Wasatch fault.

Earthquake hazards can occur miles from an earthquake epicenter; the distance depends on the type of hazard and size of the earthquake. For example, a magnitude 4.5 earthquake can cause **rock falls** within several miles of the epicenter. Conversely, rock falls and other slope failures, as well as ground shaking and **soil liquefaction** can occur more than 100 miles away from the epicenter of a magnitude 7.5 earthquake. So, for instance, in a **large surface-faulting earthquake** along the Brigham City segment, Brigham City could experience all the hazards listed above, whereas Salt Lake City or Provo would likely experience ground shaking, soil liquefaction, and slope failures, but not **surface fault rupture**.

For further information on earthquake hazards, refer to "A Homebuyers **Guide to Earthquake Hazards in Utah**" available from the Utah Geological Survey.